

Edge Machine Learning for AI-Enabled IoT Devices: A Review

Year: 2020 | Citations: 359 | Authors: M. Merenda, Carlo Porcaro, D. Iero

Abstract

In a few years, the world will be populated by billions of connected devices that will be placed in our homes, cities, vehicles, and industries. Devices with limited resources will interact with the surrounding environment and users. Many of these devices will be based on machine learning models to decode meaning and behavior behind sensors' data, to implement accurate predictions and make decisions. The bottleneck will be the high level of connected things that could congest the network. Hence, the need to incorporate intelligence on end devices using machine learning algorithms. Deploying machine learning on such edge devices improves the network congestion by allowing computations to be performed close to the data sources. The aim of this work is to provide a review of the main techniques that guarantee the execution of machine learning models on hardware with low performances in the Internet of Things paradigm, paving the way to the Internet of Conscious Things. In this work, a detailed review on models, architecture, and requirements on solutions that implement edge machine learning on Internet of Things devices is presented, with the main goal to define the state of the art and envisioning development requirements. Furthermore, an example of edge machine learning implementation on a microcontroller will be provided, commonly regarded as the machine learning "Hello World".